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Electrochemical amination: Efficiency of a radical substitution

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Abstract

Electrochemical amination of benzene in sulfuric acid electrolytes is studied and experimental conditions for highly efficient synthesis of primary aromatic amino compounds are determined. In the electrolysis of Ti(IV)-NH 2OH-C 6H 6 in 11 M H 2SO 4 solutions containing acetic acid or acetonitrile as organic solvents, aniline and isomeric phenylenediamines are obtained with the total yields by hydroxylamine of 95.6 and 99.6%, respectively. A monoamino compound is the main product of radical substitution in acidic organo-aqueous media. It is found that the use of acetonitrile in electrochemical process is limited to certain sulfuric acid concentrations and temperatures.

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Keywords

amino radical, electrophilic amination, hydroxylamine, radical amino cation, radical aromatic substitution